Submitted to the Governments of the United States and Canada

Detroit River Area of Concern

International Joint Commission
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Status Assessment

Report on the ongoing remedial and preventive efforts by responsible governments and organizations relative to restoring the Detroit River

October 1997

International Joint Commission

The **International Joint Commission** was established in 1909 by the United States and Canada in the Boundary Waters Treaty. The treaty recognizes that each country is affected by the other's actions in the lake and river systems along their common border. Its purpose is to prevent and resolve disputes concerning these shared waters. In 1972, the governments of the United States and Canada signed the **Great Lakes Water Quality Agreement**. Its purpose is to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes basin ecosystem. IJC is given the responsibility to assess and evaluate the governments' programs and progress under the 1972 Agreement and assist in its implementation. In 1978, the governments signed a new Agreement in which they made an additional commitment to rid the Great Lakes of persistent toxic substances using an ecosystem approach. In 1987, the governments signed a Protocol promising to report on progress and calling on IJC to review, among other things, Remedial Action Plans being developed and implemented for the 42 identified Areas of Concern in the Great Lakes basin.

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Introduction

Remedial Action Plans and Areas of Concern

The goal of **Remedial Action Plans** (RAPs) is to restore and protect beneficial uses in 42 identified **Areas of Concern** (AOC) within the Great Lakes basin. AOCs are areas where human activities have caused or are likely to cause impairment of beneficial human uses or the area's ability to support aquatic life. The Great Lakes Water Quality Agreement (Agreement) outlines 14 beneficial uses in Annex 2.1.c (Table 1). The governments of the United States and Canada, in cooperation with state and provincial governments, agreed to develop and implement remedial action plans in a 1987 protocol to the Agreement. Each RAP is to embody a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses and serve as an important step toward virtual elimination of persistent toxic substances. Further, the governments are to ensure that the public is consulted in all actions undertaken through RAPs.

The **International Joint Commission** (IJC) is to review and comment on RAPs during three stages of development: when the definition of the problem has been completed; when remedial and regulatory measures are selected; and when monitoring indicates that impaired beneficial uses have been restored. In 1996, after more than ten years of reviewing and assisting in development of RAPs, and expressing concern with overall progress in development and implementation of cleanup and prevention strategies in some Areas of Concern, IJC adopted a new initiative to examine progress toward restoration of beneficial uses by initiating status assessments in individual AOCs in an attempt to enhance the restoration process.

The Status Assessment Process

Status assessments are intended to: examine progress toward restoration and protection of beneficial uses, assess program implementation relative to remedial and preventive actions; and identify and make recommendations on specific activities that could be taken to overcome obstacles and make measurable progress in restoring uses in the area. These status assessments are not comprehensive environmental audits, but assessments of ongoing efforts and activities of the responsible governments and organizations. Objectives of the status assessment process include collecting information on and transferring successful methods and experiences among different Areas of Concern, and facilitating constructive interaction among various agencies and organizations that may have limited opportunity to exchange ideas.

For More Information

For more information regarding IJC, you may contact IJC public information services at:

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Information can also be obtained from the IJC web page at **www.ijc.org** or through e-mail to bondyd@ijc.wincom.net(.)

Table 1

A comparison of the Stage 1 RAP, IJC's Stage 1 review comments and the 1996 Detroit River RAP Report conclusions relative to use impairments

Use Impairment	Stage 1 RAP Conclusion	IJC Review Comments on Stage 1 RAP	1996 Report Conclusion
Restrictions on fish and wildlife consumption	Impaired due to PCB and mercury levels in certain fish	No other advisories exist; need hazard assessment for other contaminants in fish and wildlife	Impaired for fish
Tainting of fish and wildlife flavor	Not impaired	Need study to verify conclusion	Impaired for fish
Degraded fish and wildlife populations	Not impaired	Available data do not support conclusion; need definitive study	Not impaired for fish; unknown for wildlife
Fish tumors or other deformities	Impaired	Concur	Impaired
Bird or animal deformities or reproductive problems	Not impaired	Need study to support conclusion	Unknown
Degradation of benthos	Impaired	RAP does not acknowledge link between sediment toxicity and degraded benthos	Impaired
Restrictions on dredging activities	Impaired	Sediment toxicity results confirm this use impairment	Impaired
Eutrophication or undesirable algae	Not impaired	No conclusive study available; need reassessment of available data to reach definitive conclusion	Not impaired
Restrictions on drinking water consumption or taste or odor problems	Impaired	Many locations within AOC could not be sites for drinking water intakes. Existing sites have been threatened by spills	Impaired (taste and odor)
Beach closings	Impaired	Concur	Impaired
Degradation of aesthetics	Impaired	Concur	Impaired
Added costs to agriculture or industry	Not impaired	Limited documentation available; need user survey to make determination	Not impaired
Degradation of phytoplankton and zooplankton populations	Not impaired	Bioassays in Trenton Channel suggest use impairment; need definitive study	Not impaired
Loss of fish and wildlife habitat	Impaired	Sediment toxicity results and violations of water quality objectives suggest impairment due to contaminants	Impaired

The Detroit River Area of Concern

Toxic Chemical Discharges and Contamination

The binational Detroit River Area of Concern is a large, primarily urban area encompassing the metropolitan areas of Detroit, Michigan and Windsor, Ontario. There are more than three million people living in the metropolitan area of Detroit and more than 280,000 in the area surrounding Windsor. Approximately 13,000 commercial and industrial dischargers are connected to the Detroit wastewater treatment plant, with 446 considered major dischargers. Almost 1,300 commercial and industrial dischargers are served by Windsor wastewater control plants, including 70 major dischargers.

Because of the numerous dischargers and larger population in the Detroit metropolitan area, there are more significant environmental problems on the Michigan side of the river. This disproportion must be borne in mind in assessing the responsibilities, achievements and deficiencies in the implementation of the RAP. Overall, sediment is more contaminated on the Michigan side of the river than on the Ontario side. According to the 1996 Detroit River RAP report, the Michigan side of the lower Detroit River has the highest degree of sediment contamination and majority of severely impacted benthic communities. The least contaminated sediments and nonimpacted benthic communities generally are found in the upstream, Ontario portion of the Detroit River AOC.

The existing contaminated sediment problem and the continued loading of mercury and polychlorinated biphenyls (PCBs) contribute to concerns regarding impacts on aquatic life and human health. Table 2 shows the relative contribution of major PCB loading sources to the Detroit River. Sources upstream of the AOC contribute nearly 50 percent of the load, while Michigan's point sources, including the Detroit wastewater treatment plant but excluding combined sewer overflows, comprise 16 percent. Elevated levels of persistent toxic substances and effects on fish and wildlife in the Detroit River are documented (Maccubbin *et al.* 1990, Weseloh *et al.* 1990). The Stage 1 RAP documented neoplasms and pre-neoplastic lesions in bowfins, bullheads, redhorse suckers, walleye and white suckers.

Human Health Implications

While no directly applicable human health research has been completed within the Detroit River AOC regarding the potential effects of consuming contaminated fish, research (Johnson *et al.* 1997) elsewhere regarding the possible neurobehavioral effects of consuming environmentally contaminated fish is useful. The Jacobsons and others (Jacobson *et al.* 1984) found associations between the amounts of Lake Michigan fish consumed by mothers and behavioral changes on the Neonatal Behavioral Assessment Scale. Children born to mothers consuming the greatest amounts of contaminated fish showed more abnormally weak reflexes, greater motor immaturity and more startles, and less responsiveness to stimulation.

Other researchers (Lonky *et al.* 1996) have replicated and extended the Jacobsons' study by examining whether similar results would occur in babies born to mothers who consumed Lake

Annual PCB Loadings to the Detroit River

Source: Stage 1 Remedial Action Plan for the Detroit River Area of Concern, June 1991.

Table 2 **Annual PCB Loadings to the Detroit River**

Source	kg
Upstream Inputs	295.65
Michigan CSOs	167.90
Michigan Point Sources	110.23
Ontario Tributaries	43.80
Michigan Tributaries	42.34
Ontario Point Sources	14.31
Michigan Stormwater	4.02
Windsor Stormwater	0.04
Windsor CSOs	0.09

Ontario fish. Three groups were formed in the Lonky study: high fish consumers, low fish consumers and a no fish eating control group. Babies born to mothers who consumed high amounts of Lake Ontario fish were found to have poorer reflex functioning and greater autonomic immaturity. They also appear to be over-reactive to stimulation compared to the low fish and no fish eating groups.

A Michigan study (Courval *et al.* 1997) examining possible effects of environmental contaminants, particularly organochlorine compounds, on human reproduction was conducted from 1993-95. Adjusting for age, race, region of Michigan, household income, educational attainment, smoking, alcohol consumption and sport-caught fish consumption, data from the study suggest a modest association, in men only, of sport-caught fish consumption with the risk of conception failure after trying to conceive for at least twelve months.

In a related study, researchers (Tay *et al.* 1997) attempted to evaluate the bias introduced by non response in the Courval study detailed above. The Tay study concluded that the association between sport-caught fish consumption and conception failure in male non responders is consistent with the findings noted in Courval *et al.*

These data and the presumed low level of awareness regarding fish consumption advisories within the Detroit River subsistence fishing community raise concern regarding human health issues in the AOC. To date, most emphasis on human health concerns in the Detroit River AOC appears to be focused on issues related to air pollution rather than the possible effects of sport-caught fish consumption.

Detroit River Assessment History

IJC's first examination of water quality conditions in the Detroit River took place in 1912 in response to a request from the governments of the United States and Canada to examine the extent and causes of pollution in the Great Lakes. Water quality problems related to raw sewage were identified in the Detroit River and other connecting channels in the basin. Although problems relating to raw sewage have been substantially corrected in most areas and water born disease epidemics eliminated, other problems, such as the presence of persistent toxic substances, have been subsequently identified in the Detroit River and in other areas of the Great Lakes basin. These problems became the subject of the 1978 Agreement and the 1987 Protocol.

A Stage 1 RAP (problem identification) for the binational Detroit River Area of Concern was submitted for IJC review in June 1991. Identified sources of pollution were: contaminated sediment; point source discharges from municipal and industrial sources including combined sewer overflows; and non point sources of pollution from such sources as urban stormwater runoff and air deposition of toxic substances. Environmental issues of concern included: changes in fish community structure; loss of fish and wildlife habitats; impact on biota from water and sediment quality; and exotic species. IJC's review was submitted to the Parties in May 1992 and was critical of the scope of the available data collected and initiatives to define the environmental problems (Table 1).

The 1996 Detroit River RAP Report updated the status of beneficial use impairments (Table 1). The report addressed the ability to restore the currently impaired beneficial uses. Impairments listed as very difficult to remove were restrictions on fish and wildlife consumption, tainting of fish and wildlife flavor and fish tumors and other deformities. Overcoming the degradation of benthos, restrictions on dredging activities and beach closings were listed as moderately difficult. Restoration of aesthetics and conservation and enhancement of fish and wildlife habitats were judged to be the most readily achievable.

Contaminated sediment is a major cause of beneficial use impairments. The Report states that, "it appears that the present status of Detroit River sediments is generally moderately to severely contaminated and that major improvements have not occurred . . . during the past 5-10 years . . . "

Current Status Assessment

This current status assessment of the Detroit River RAP was conducted between November 1996 and September 1997 and included consultation between IJC Commissioners and citizens; representatives of government agencies, local industries, municipalities, nongovernmental organizations; and the media. In addition to this public consultation, IJC's Science Advisory Board conducted a public meeting concerning issues of scientific relevance to the development and implementation of the RAP. To gauge progress toward restoration of the binational Detroit River Area of Concern, an examination was conducted in the following areas: funding; institutional structure; roles of the Parties, jurisdictions and other sectors; and public consultation. This evaluation examines activities within the AOC that foster restoration of beneficial uses and is not confined to activities conducted as part of the RAP.

Accountability for Restoring Uses in the Detroit River

A key concept in the RAP process is accountability for action. This is established through open sharing of information, clear definition of problems (including identification of indicators to be used in measuring when the desired state is reached), identification of causes, agreement on actions needed and identification of who is responsible for taking action. From this foundation, the responsible institutions and individuals can be held accountable for progress.

Findings

Successes

Notable successes toward restoration of the Detroit River AOC were recognized during the Status Assessment.

- **Since 1971, Detroit has spent nearly one billion dollars (U.S.) in sewer infrastructure upgrades to benefit the restoration of the Detroit River. One recent improvement was a $120 million (U.S.) pumping station, which benefits the proper operation of the Detroit Wastewater Treatment Plant. Currently, there are plans for an additional one billion dollars (U.S.) of improvements including an increase in the primary treatment capacity.**

- **The City of Windsor has engaged in $100 million dollars (Cdn.) worth of upgrades to its wastewater treatment operations. The most recent improvement is the upgrade to Windsor's Little River Pollution Control Plant.**

- **The Detroit Water and Sewerage Department in cooperation with the National Wildlife Federation has implemented a PCB and mercury minimization program.**

- **Private corporations funded the removal of 20,000 cubic yards of sediment contaminated by lead, zinc, PCBs and phenolic compounds in Monguagon Creek.**

- **Pollution prevention projects have been undertaken by Chrysler Canada, Ford Motor Canada, and General Motors of Canada in conjunction with the Canadian Vehicle Manufacturers Association and by Chrysler, Ford and General Motors in conjunction with the American Automobile Manufacturers Association.**

- **Initial steps are being taken by Windsor and Detroit companies and local elected officials to establish a local trust-like organization to improve the Detroit River waterfront.**

- **A cooperative effort initiated between U.S. Environmental Protection Agency's Great Lakes National Program Office and the Michigan Department of Environmental Quality that is directed toward achieving remediation of contaminated sediment in the Detroit River's Trenton Channel.**

- **Habitat rehabilitation and conservation projects have been implemented at Detroit's Belle Isle Park; Windsor's Coventry, Reaume, and Alexander Parks; Ruwe Marsh located north of Canard River; and the Canadian Salt Company facility.**

Obstacles and IJC Recommendations

In order to further the Detroit River RAP process and achieve additional ecosystem improvements, a number of obstacles must be addressed. Presented below are key obstacles and IJC recommendations. It must be recognized that many of these impediments toward restoration are interrelated and movement to overcome one may have a beneficial effect on overcoming others.

Lack of Leadership: Lack of leadership by the U.S. Environmental Protection Agency and the Michigan Department of Environmental Quality has hindered implementation efforts in the Detroit River AOC. While the State of Michigan, under a memorandum of understanding with the Province of Ontario, accepted the lead for achieving restoration of the AOC, its Department of Environmental Quality now considers itself only a participant in the cleanup.

Recommendation:

- **The State of Michigan should meet its leadership commitments or intiate discussions with the Parties to ensure adequate leadership is provided. It should be noted that the Michigan Department of Environmental Quality and U.S. Environmental Protection Agency are collaborating on contaminated sediment work for the Trenton Channel. This is an excellent start toward a necessary type of leadership.**

The Detroit River AOC Requires a Higher Profile with Elected Officials: Restoration of the Detroit River AOC requires that river cleanup become a high priority and be maintained as a high priority with elected officials at all levels of government. IJC notes that this has occurred in the Rouge River AOC. Elected officials' involvement in the Rouge River AOC has contributed directly to securing more than $600 million in infrastructure improvements to address combined sewer overflows and urban stormwater runoff.

Recommendation:

- **Efforts should be made to secure elected official involvement in all future activities of the Detroit River RAP. This should include regular briefings of elected officials, review of future iterations of the Detroit River RAP and binational dialogue between Canadian and U.S. elected officials. These elected officials should be sought out as champions of the Detroit River RAP. Good examples of RAPs that have benefitted from elected official involvement include the Rouge River, Hamilton Harbor, Ashtabula River and Severn Sound RAPs.**

Lack of Financial Commitment from Federal, State and Provincial Governments: It is recognized that the costs of environmental remediation will be substantial. Local partnerships and financing provided by various sectors of the community should only be supplementary sources of funding and not substitutes for a strong financial commitment by the U.S. and Canadian federal, state and provincial governments.

Recommendation:

- **Federal, state and provincial governments should demonstrate commitment to the Detroit River AOC and the Great Lakes Water Quality Agreement by providing sufficient financial and human resources. Current levels of support should be examined and financial support should be prioritized to reflect the importance of this binational AOC.**

Insufficient Examination and Evaluation of Restoration Options and Priorities: Currently, due to limited resources and the present status of environmental problems, only a partial restoration is likely to be achieved over a number of years. The 1996 Detroit River RAP Report identified 104 recommendations. No mechanism is currently in place to evaluate these options relative to achieving the desired future state of the Detroit River. For example, contaminated sediment remediation receives no higher priority for funding than restoration of fish and wildlife habitats. However, a proposed RAP implementation structure has been prepared for consideration by the Binational Public Advisory Council. If approved, this structure will identify implementation activities based on recommendations from the RAP.

Recommendation:

- **A cooperative modeling effort between Ontario Ministry of Environment and Energy's Science and Technology Branch and U.S. Environmental Protection Agency's Large Lakes Research Station should be established to evaluate and prioritize remedial and preventive options.**

- **Remedial options to address contaminated sediments on the Michigan side of the river must be developed and implemented. The limited available funds should be invested in remedial actions that will provide optimal environmental net benefit.**

- **Additional research necessary for restoration should be supported by a stable, competitive funding process (e.g., in Green Bay, Wisconsin this has not only furthered restoration, but has saved money).**

Limited Business and Industrial Involvement in AOC Restoration: Options exist to better involve business and industry in the effort to restore the AOC. Barriers and incentives to business and industrial involvement must be identified to ensure meaningful involvement. As restoration progresses, there could be considerable benefits from establishing a community partnership organization for cleanup of the Detroit River and contaminated sediments.

Recommendation:

- **Action should be taken to fully involve major industrial and business interests in the restoration effort.**

- **Community stakeholders from Detroit and Windsor should consider the option of establishing a Detroit River community organization to: champion cooperative, binational cleanup of the Detroit River and sediments; bring private and public partners together for revitalizing the Detroit River and be a catalyst for projects to move them forward further and faster. Extensive outreach efforts should be conducted within the business and industrial sectors of the communities. These efforts should include a compilation and dissemination of information on economic and environmental benefits of initiatives such as remediating contaminated sediment. A community oriented, Public-Private Partnership has been successful in Ashtabula, Ohio**

Limited Commitment to Monitoring: Historically, there was an extensive monitoring program for the Detroit River to assess water quality, estimate loadings, identify pollution "hot spots" and evaluate program effectiveness. Due to budget cuts and changing priorities, these monitoring programs for the Detroit River have been substantially cut or eliminated. Monitoring, assessment and research must be seen as a priority to ensure cooperative restoration. There also must be a strong coupling of management and research/monitoring.

Recommendation:

- **Governments must view monitoring as part of their core environmental program in order to evaluate program effectiveness and make mid-course corrections. Further, efforts should be made to ensure a close coupling of management and monitoring/ research to achieve maximum environmental remediation. Current efforts to monitor and assess the Trenton Channel should be expanded to the entire Detroit River ecosystem.**

Inadequate Citizen Involvement and Consultation: There is too little public awareness or acceptance of the need to restore uses in the Detroit River. Historic industrial discharges to the Detroit River and the continued input of persistent toxic substances have become culturally accepted by portions of the local population. Greater effort must be expended to inform citizens, including school age children, regarding current environmental conditions and specific restoration goals. It is noted that Canada and Ontario have implemented outreach campaigns in local secondary schools. While undertaking this status assessment, IJC found no evidence of specific outreach programs directed at the most impacted subset of the AOC's population. In particular, more effort is required to inform subsistence fishers of the risks from the consumption of environmentally contaminated fish.

An additional opportunity for citizen involvement is productive participation in the Binational Public Advisory Council. During a 1996 meeting, 14 members of the Binational Public Advisory Council walked out in protest. These members represented environmental groups, labour and citizens.

Recommendation:

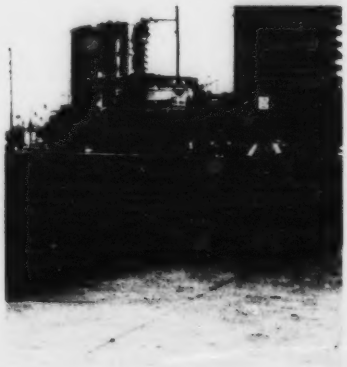
- **More resources should be devoted to public outreach efforts, particularly within the more impacted sub-populations consuming sport caught fish from the Detroit River. Further, greater media coverage of the Detroit River AOC must be achieved (particularly in Detroit) to complement outreach efforts.**

- **The current Binational Public Advisory Council should be restructured and the successor or comparable organization allows greater citizen input. Citizens should be partners in the development and implementation of initiatives for remediation.**

Concluding Remarks

Incremental steps toward restoration of beneficial uses have been taken. Substantial investments, such as nearly 100 million dollars (Cdn) spent on municipal infrastructure improvements by the city of Windsor and one billion dollars (U.S.) by the city of Detroit over the past 25 years, have been noted. Because of the industrial legacy, considerable environmental problems persist particularly in regard to contaminated sediment. Due to the magnitude of the existing problem and the continued input of persistent toxic substances, extraordinary efforts and funding are required to enhance the restoration process. All participants must recognize the long-term nature of the commitment that will be necessary. To date, too little effort has been devoted to specific remedial actions and too few persons have acknowledged the magnitude of financial resources needed to accomplish any sizable increment of remediation of the contaminated sediment or sewer infrastructure problem. Due to a U.S. Environmental Protection Agency and Michigan Department of Environmental Quality leadership void, no partnership has evolved, to date, to tackle high priority environmental problems of the Detroit River AOC. Economic and social benefits of environmental improvements should be measured and used as justification for necessary future actions.

It is well accepted that a healthy economy requires a healthy environment. Both the Detroit and Windsor metropolitan areas are beginning to experience economic recovery after years of economic decline. There are competing priorities within the Area of Concern that drain limited resources. The revitalization of economic and community development must work hand and hand with environmental protection and resource conservation. Further, it must be recognized that a clean environment aids in revitalization of the community and improvement in the economic base.



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Schedule of Consultations

October 15, 1996	U.S. Army Corps of Engineers and IJC staff
October 21, 1996	Michigan Department of Environmental Quality and IJC staff
October 22, 1996	Environment Canada, Ontario Ministry of the Environment and Energy and IJC staff
October 23, 1996	U.S. EPA and IJC staff
November 13, 1996	Binational Public Advisory Committee, local industry representatives, IJC Commissioners, IJC staff participated; and members of the public, government agency personnel, the media attended as observers.
November 14, 1996	Non-governmental organizations, IJC Commissioners, IJC staff, and local industry reporesentatives participated; and members of the public, government agency personnel and the media attended as observers
November 20, 1996	Science Advisory Board Public Meeting
December 18, 1996	City of Windsor Public Works Department, IJC Commissioners and IJC staff
December 18, 1996	Michigan Department of Environmental Quality, U.S. EPA, IJC Commissioners and IJC staff
December 19, 1996	Southeast Michigan Council of Governments, IJC Commissioners and IJC staff
December 19, 1996	City of Detroit Water and Sewerage Department, IJC Commissioners and IJC staff
May 30, 1997	U.S. EPA Region 5, IJC Commissioners and IJC staff
June 5, 1997	Russell Harding, Director of Michigan Department of Environmental Quality, IJC Commissioners and IJC staff
June 17, 1997	Environment Canada, Ontario Ministry of the Environment and Energy, IJC Commissioners and IJC staff
June 24, 1997	Representatives from Chrysler, Ford, General Motors, American Automobile Manufacturers Association, Canadian Vehicle Manufactures Association, IJC Commissioners and IJC staff
September 18, 1997	Mayors of Detroit and Windsor and IJC Commissioners